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The Specificity of Developing Metacognition at Children with Learning Difficulties

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Abstract

In this study, we intend to analyse the issue concerning the specificity of the development of the children with learning difficulties. The objectives aimed to identify the methods and instruments for developing the metacognitive skills at children with learning difficulties, to stimulate the mental operations of these children and to involve the non-cognitive factors in learning activities, to involve self-reflection, as a premise for the development of metacognition, to test the abilities of self-knowledge, self-analysis, self-appreciation and self-evaluation of the students with learning difficulties. The methods used were based on constructivist approaches, which lay special stress on the students' construction of learning. The results obtained highlighted the improvement of school results of the students from the experimental group, in comparison with those from the control group.

Keywords: metacognition; self-esteem; metacognitive skills; learning difficulties; personal reflection;

1. Introduction

The success of a certain activity unfolded by an individual is mainly provided by the possibility of involving one's metacognitive skills, and not just its cognitive ones (Grangeat, 1999). Most of the time, these skills make the difference between the students who manage to obtain scholar success and those who do not succeed this thing. Many times, the success is provided by the possibility of accomplishing a control and an adjustment over one's own activity (Delvolvé, 2006). In its most common definition, that of the knowledge of the knowledge, metacognition has a very special role in the learning activity, by coming along with this one and in the same time offering the learner the possibility of analyzing and interpreting the information in terms of efficiency and proficiency for that certain action and moreover for the future ones. Therefore, metacognition does not only mean

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the knowledge that the student achieves about its own cognitive activity, but it also implies the usage of certain self-control and self-regulation mechanisms. Due to metacognition the learner becomes aware of its own mental activity.

As in the case of cognitive activities, the metacognitive skills are driven and valorized in a different way by each student, according to one's psycho-individual characteristics (Flavell, 1976).

The metacognitive activity gains more specific notes when we refer to a certain category of children, that of the children with learning difficulties. The problem of developing the metacognition to these children has been analysed under different aspects in the literature of the specialty.

Therefore, Anne-Marie Doly (2002; 2000) and other researchers say that the lack of efficiency of the efforts made by the students with learning difficulties must be related with a deficiency of the metacognitive nature, more than of a cognitive type. We have to mention that we will refer to children with learning difficulties, who have a normal level of intellectual development and not to children with special educational needs, to whom the learning difficulties appear as an effect of the deficiencies they have. These children have knowledge and abilities at a required level, but they do not know how to use or to transform them. In this situation, the failure is mainly because these children do not know what they know.

2. Research design and methodology

We have proposed to accomplish an improving psycho-pedagogical research having as main aim the specific of the development of metacognition in the case of children with learning difficulties.

2.1. Hypotheses and objectives

The hypotheses of the research, both the general and the particular ones considered the identification of certain concrete means of stimulating the metacognition of the children with learning difficulties. Therefore, we consider that *the frequent use of certain self-reflection, self-analysis and self-regulation methods and instruments stimulates the metacognitive abilities.* This was the general hypothesis of the present research. According to the general hypothesis, we have stated the following specific hypotheses: a) If the teacher involves students' personal reflection in solving certain concrete tasks, the students will improve their metacognitive skills; b) The students' usage of certain inter-evaluative methods leads to an increased objectivity of the self-evaluative process, which has a (self) regulating effect on the metacognitive dimension; c) We consider that the improvement of the metacognitive skills has major implications over the cognitive dimension, with positive effects on the school results of the students with learning difficulties.

The main aim of this paper is to test the effectiveness of a specific set of techniques that could stimulate the development of metacognitive skills in students with learning difficulties.

The objectives aimed: a) to identify the methods and instruments for developing the metacognitive skills of the children with learning difficulties; b) to stimulate the mental operations of these children; c) to involve the non-cognitive factors in learning activities; d) to test the self-knowledge, self-analysis, self-appreciation and self-evaluation abilities of the students with learning difficulties; e) to identify the relationship between the cognitive and metacognitive aspects, with reference to the school results.

2.2. The sample and Research Methods

The sample of subjects, which was made up of 1100 students from the 9^{th} form, was divided, in the experimental stage into: the experimental group (at which independent variables have been introduced pursuing their effects, and respectively, dependent variables) and the control (observer) group, which carried out its activity without any intervention. The distribution of the subjects into the two groups is presented in the table 1.

Table 1. The distribution of the subjects into the two groups

The ascertaining stage	The experimental stage, of the post-test and re-test	
The initial group	The control group	The experimental group
1100	549	551

The research was carried out during two school years, including certain stages with different time duration (see the table 2).

Table 2. The research stage

Stages	Pre-ascertaining	Ascertaining / Pre-test	Experimental	Post-test	Re-test
Duration	October 2010 – May 2011	15th September 2011 – 15th October 2011	15th October 2011 – 1st June 2012	1st June 2012 – 15th June 2012	September 2012

First, we identified the students who had learning difficulties at one of the main school subjects, representative for the School Framework, namely Romanian Language and Literature. For these children with learning difficulties we followed the development level of their metacognition. Taking into consideration the complexity of the problem and the need to obtain data, pertinent results, relevant from the statistic point of view, we used a great number and variety of research methods and instruments for each stage of the research work. As the hypotheses of the research have traced its main directions, we mention the main means of accomplishment, by referring to the independent variables (i.v.), respectively dependent (d.v.), which lay down from the hypotheses (see table 3).

Table 3. Means of accomplishing the pedagogical experiment

Crt. no.	The variables of the research	Means and instruments of accomplishment
1	Using personal reflection (i.v.) determines the development of metacognition (d.v.)	- Accomplishing certain observation, comments, interpretation, and critical analyses sheets;- Using certain sheets of personal reflection; - Completing certain sheets, drills of self-evaluation of the metacognitive skills; - Accomplishing SWOT analyses regarding successful/unsuccessful aspects of their individual learning activity and possible risks or opportunities.
2	The frequent usage of certain methods, techniques and instruments to stimulate the metacognition (i.v.) can lead to the development of the metacognitive skills (d.v.)	- Elaborating personal diaries; - Filling in certain questionnaire; - Self-analyses drills.
3	The improvement of the metacognitive skills (i.v.) has major implications on the cognitive dimension, with positive effects on the school results of the students with learning difficulties (d.v.)	- Self-evaluation tests; - Personal portfolios; - Self-reflection diaries; - Self-observation sheets

Stimulating the metacognition materializes in the choosing and formulating tasks which flashes and smoothens the inquiring (for example, in the situation of certain tasks which involve open researches, solving some complex problems, the implication in any task which implies a challenge, an attempt). That is to say, any activity that asks the students, especially those with learning difficulties, to evaluate in a self-directed way their own deeds.

In this respect, we have proposed and used within the experiment different models, methods and instruments based on the stimulation of the metacognition for a constructivist training. Here are some of them (Joita, 2006,

cited in Mogonea, 2010): the **Model E-A-R** - Evocation - meaning Achievement – Reflection; the **Model of the *5 E*s** –**E**ngage, **E**xplore, **E**xplain, **E**laborate and **E**valuate.; the **Model ETER** (**E**xperience, **T**heory, **E**xperimentation, **R**eflection) – especially the last stage offers the occasion to stimulate the metacognitive skills, by the use of the reflection; the **Model CETP/SIS** – similar to the model of the five Es. We have also exploited the following procedures (Joita, 2006, cited in Mogonea, 2010): conceiving questions, hypotheses, opinions, explanations, anticipations; accomplishing mental self-evaluations, reinterpretations, paraphrases, reorganizations, connections, combinations and re-combinations; highlighting obstacles and errors, building certain self arguments or counterarguments, self communication, confronting self reflections in group, verbalizing self reflections.

3. Results

The results obtained by the students from the experimental classes at the applied tests confirmed the efficiency of the proposed means.

Table 4. The results obtained at the applied tests

Form	The research stage		
	The ascertaining stage (pre-test)	Post-test	Re-test
The control group	7.32	7.26	7.30
The experimental group	7.24	7.86	7.80

In the table no. 4., we have presented the averages of the two groups (the control and the experimental group) in three important moments of the research: the pre-test (before starting the experiment), the post-test (after the formative intervention) and the re-test (the remote evaluation). There have been recorded qualitative differences at the experimental group, in comparison with the control one, where, without a formative intervention, the results remained approximately the same with the ones from the initial stage. In order to establish the statistic relevance of the difference between the averages, we have applied the **Z** test (see statistic formula 1), which enables a comparison between the two types of samples, according to the stages of the research (Novak, 1977).

$$Z = \frac{|x_1 + x_2|}{\sqrt{\frac{\sigma_1^2}{N_1}} + \sqrt{\frac{\sigma_1^2}{N_2}}} \quad (1)$$

In the table 5, we will present the value obtained at test Z, at a signification threshold of P< 0,01.

Table 5. The value of ***Z***, depending on the stage of the research

	The stage of the research		
	Pre-test	Post-test	Re-test
The value of Z	1.45	5	4.54
The signification threshold	< 0,01	< 0,01	< 0,01

The value of Z is statistically relevant in the post-test and re-tests stages, which proves the validity of the hypotheses and the success of the experiment. The results obtained prove the efficiency of the established actionable-methodological means (of the instruction models and of the methods and instruments used).

4. Conclusions

The results highlight the importance of the relationship between the cognition – metacognition - school results. The surveys (Lafortune, Saint-Pierre, 1998; Wolf, 1992) prove that the metacognitive dimension is very important in obtaining higher school results, together with the cognitive and non-cognitive factors.

The study and the results fall to a direction established by Flavell - who has been attributed the concept of metacognition – passing through the behaviourism, cognitivism and constructivism. Similar studies (Dolly, 2002) highlight the same aspects, by different surveys carried on heterogeneous samples (nationality, school subject, age, sex).

Our investigative demarches have revealed the importance and necessity of using certain techniques for developing the metacognitive strategies (the E-A-R model, the model of the 5 Es, the ETER model, the CETP/SIS model, tests, questionnaires, personal self-reflection diaries etc.), based on cognitive and social-constructivist approaches, centred on the individual or group activity of the students.

The research, through its results and conclusions, offers new and multiple possibilities of approaching the phenomenon of metacognition of the children with learning difficulties (or with special educational needs, or elitists, or of the other categories of students), with the aim to identify certain methods, means, instruments and techniques which can be used to get the best school results.

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